Methane Emissions

MRV for the Gas Industry

16th Gas Forum - 23 Sept 2021 - Ljubljana

Bart Wauterickx
CEO The Sniffers
Environmental & Integrity Service Provider

- Emission Management
- Pipeline Integrity

- 35 Countries
- Worldwide experience

- 9,000
- Executed Projects

- Innovative Technologies,
  Equipment and Applications

- Reliability
  - ISO 9001-14001 // ISO 17025 Lab
  - 612-TEST Belac  389-TEST Israc

Realizing your Environmental, and Sustainability Ambition
Safe, Compliant, and Efficient Pipeline Operations
Reporting against OGMP2.0

Level Scenario

Level 1
- Venture / Asset Reporting
  - Single, consolidated emission factors
  - Only applicable where company has limited information sharing

Level 2
- Emission Category
  - Report emissions based on methane emissions categories
  - Estimates based on emission factors

Level 3
- Emission Source Level
  - Emissions allocated to individual source types
  - Estimates based on generic emission factors

Level 4
- Emission Source Level
  - Emissions allocated to individual source types
  - Estimates based on specific EFs and direct measurements

Level 5
- Site Level
  - Emissions allocated to individual source types
  - Reporting based on site-level measurements to reconcile source and site level emissions estimates

GOLD Standard
Plan in place to report at level 4/5 within 3 years (5 for JV's)
### Upstream 13 Source types

1. Stationary Combustion
2. Flaring (Incomplete Combustion)
3. Fugitive Component and Equipment Leaks
4. Natural gas driven pneumatic equipment
5. Centrifugal compressor shaft seals
6. Reciprocating compressor rod packing
7. Glycol dehydrators
8. Tanks
9. Well liquids unloading
10. Well casinghead venting
11. Hydraulic fracture completions
12. Venting - Other
13. Others Sources

### Mid and Downstream 3 Source types

<table>
<thead>
<tr>
<th>1</th>
<th>Fugitive Emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Connections (flanges, seals, joints)</td>
</tr>
<tr>
<td>2</td>
<td>Valves and control valves</td>
</tr>
<tr>
<td>3</td>
<td>Pressure relief valves</td>
</tr>
<tr>
<td>4</td>
<td>Blow-down open ended line)</td>
</tr>
<tr>
<td>5</td>
<td>Open ended Lines</td>
</tr>
<tr>
<td>6</td>
<td>Others</td>
</tr>
<tr>
<td>7</td>
<td>Permeation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2</th>
<th>Vents</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Operational emissions - Purging &amp; venting Methane emissions associated to maintenance activities, process, commissioning &amp; decommissioning.</td>
</tr>
<tr>
<td>9</td>
<td>Operational emissions - Regular emission technical devices Methane emissions associated to pneumatic devices, gas analysers,...</td>
</tr>
<tr>
<td>10</td>
<td>Operational emissions - Starts &amp; stops Start/stop of the compressor stations of the transmission grids or the underground gas storages.</td>
</tr>
<tr>
<td>11</td>
<td>Incidents / emergency situations</td>
</tr>
<tr>
<td>12</td>
<td>Others Start/stop of the gas combustion devices (turbines, engines, boilers...) and flares will be reported in “Others”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3</th>
<th>Incomplete combustion</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>Gas combustion devices</td>
</tr>
<tr>
<td>14</td>
<td>Flaring</td>
</tr>
</tbody>
</table>

---

**Source Types: Upstream and Mid/Downstream**
On Site Measurement and Data Collection

Fit-for-Purpose Technology

© 2021 The Sniffers
Methane Site Measurements
Fit-for-Purpose Technology Drone or Fixed Sensor data

© 2020 The Sniffers

OGMP Level 5
• Start ! Organize measuring campaigns
• Install processes for
  • Repairing Leaks
  • Engineering Changes
• Facilitate the Culture Change
• Not rocket science
Bart Wauterickx
CEO
The Sniffers
Belgium
+32 14 31 88 88
Bart.Wauterickx@The-Sniffers.com